

PARTIAL PREMIX DUAL CIRCUIT FUEL INJECTOR

ABSTRACT OF THE DISCLOSURE

5 A low emission fuel injection system and combustion chamber for use
in gas turbine engines comprises one fuel injection body having a dual circuit to
supply both pilot and main fuel systems. Both pilot fuel circuit and a main fuel
circuit inject fuel at essentially the same axial and radial location. The recessed
pilot fuel injection site is along the combustor centerline into a swirling air
10 passage produced by axial air swirlers. The main fuel is injected radially
through a plurality of injection sites, at a compound angle, into the inner
diameter of a swirling air passage produced by radial air swirlers. The fuel/air
residence time prior to entering the combustion chamber is relatively short,
minimizing the likelihood of auto ignition. During pilot circuit only operation, the
15 flame is stabilized by a swirler produced recirculation zone, producing high
temperatures to completely burn the fuel producing low CO and UHC
emissions. During intermediate and high engine power conditions, both the
main fuel and pilot circuits discharge fuel into a swirler produced, high air flow,
recirculation zone producing a fuel lean, low temperature flame to reduce NOx
20 emissions.